

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RCA90149	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 00/ 17475	International filing date (day/month/year) 26/06/2000	(Earliest) Priority Date (day/month/year) 05/10/1999
Applicant THOMSON LICENSING S.A		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

21

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/17475

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04L12/56 H04Q11/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 848 142 A (YAKER RHODA) 8 December 1998 (1998-12-08)	1-4, 6-10, 12-17 18
Y	column 4, line 25 - line 45 column 6, line 14 - line 18 ---	
Y	EP 0 928 123 A (AT & T CORP) 7 July 1999 (1999-07-07) column 1, line 1 - line 10 column 3, line 4 - line 11 column 16, line 9 - line 13 column 20, line 25 - line 28 ---	18
A	US 5 007 076 A (BLAKLEY JAMES R) 9 April 1991 (1991-04-09) figure 17 -----	4, 5, 10, 11, 13

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

26 October 2000

Date of mailing of the international search report

07/11/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Gregori, S

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/17475

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5848142	A	08-12-1998	NONE		
EP 0928123	A	07-07-1999	CN	1230064 A	29-09-1999
US 5007076	A	09-04-1991	US	4899358 A	06-02-1990

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 03 September 2001 (03.09.01)	Applicant's or agent's file reference RCA90149
International application No. PCT/US00/17475	Priority date (day/month/year) 05 October 1999 (05.10.99)
International filing date (day/month/year) 26 June 2000 (26.06.00)	
Applicant RICHARDSON, John, William et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
02 May 2001 (02.05.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Antonia MULLER Telephone No.: (41-22) 338.83.38
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WO 01/26307 A1



Published:

— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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National Application No.

PCT/US 00/17475

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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

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Date of mailing of the international search report

07/11/2000

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Gregori, S

INTERNATIONAL SEARCH REPORT

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US 5007076	A	09-04-1991	US 4899358 A	06-02-1990

10/089714

PATENT COOPERATION TREATY

PCT

REC'D 24 JAN 2002

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RCA90149	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/17475	International filing date (day/month/year) 26/06/2000	Priority date (day/month/year) 05/10/1999
International Patent Classification (IPC) or national classification and IPC H04L12/56		
Applicant THOMSON LICENSING S.A		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 02/05/2001	Date of completion of this report 22.01.2002
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Hamer, J Telephone No. +49 89 2399 8827 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US00/17475

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,2,4-27	as originally filed		
3,3a	as received on	21/11/2001	with letter of 21/11/2001

Claims, No.:

1-10	as received on	21/11/2001	with letter of 21/11/2001
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Drawings, sheets:

1/21-21/21	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US00/17475

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-10
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

2. Citations and explanations
see separate sheet

V- Reasoned Statement

1. The following documents are cited:

D1: US-A-5 848 142 (YAKER RHODA) 8 December 1998 (1998-12-08)

D2: EP-A-0 928 123 (AT & T CORP) 7 July 1999 (1999-07-07)

D3: US-A-5 007 076 (BLAKLEY JAMES R) 9 April 1991 (1991-04-09)

2. Claim 1

The subject-matter of claim 1 of the present invention is concerned with a system for providing a messaging service over a digital subscriber loop using ATM virtual paths/virtual channels. In the claim, part of the ATM switch monitors a call which is to be delivered over the digital subscriber loop via an ATM virtual path/virtual channel to a receiving device which could, according to claim 2, be a customer premises equipment. If the receiving device does not answer the call, the call is routed to a message processor.

Many commercial private branch telephone exchange systems in use before the priority date of the present application have the features that incoming calls which are not answered by the receiving device (i.e. telephone) are routed to a central processor controlled answering machine or "voice mail" system which answers the call and processes a message.

An example of such a centralised message processing system is found in document D1. In this document, if a subscriber engaged in a call does not answer a further call, this further call is passed to a central message processor (see D1, col. 6, lines 13 to 17). The applicant has pointed out that claim 1 of the present application takes place in an ATM environment, whereas D1 is concerned with an ISDN system, and that thus D1 could not have anticipated problems and solutions of providing a messaging service in the ATM environment. The examiner does not agree with this point of view. Whilst the present claim 1 is now certainly novel over D1 due to taking place in an ATM environment, it merely involves the use of a known messaging feature in a known environment, i.e. ATM. The features of the claim merely deal with the problem of providing a messaging service in an ATM

environment. The solution proposed by the claim is to provide this messaging service. The claim remains silent as to how this is done and as to whether any particular problems occur or how they are solved.

As a result of the above, all the features of claim 1, i.e. the ATM environment and messaging services, are well known from the prior art and claim 1 does not involve an inventive step. Thus claim 1 does not meet the requirements of Article 33(3) PCT.

3. The subject-matter of independent claim 7 is essentially the same as that of claim 1, but expressed in terms of method. Thus for the same reasons outlined above, claim 7 also does not meet the requirements of Article 33(3) PCT.
4. Dependent claims 2 to 6 and 8 to 10 are not appended to an independent claim which meets the requirements of Article 33(3) PCT. Furthermore, their subject-matter does not appear to contain anything of inventive significance which added to that of claim 1 would provide an inventive step. No features are disclosed which are not either already known from the prior art documents listed above or which are not obvious to a person skilled in the art of voice messaging.
5. The following deficiencies are found in the application:
 - a) The claims do not meet the requirements of Rule 6.2(b) PCT in that they do not contain reference signs.
 - b) The independent claims do not meet the requirements of Rule 6.3(b) PCT in that they are not divided into the two-part form.
 - c) The description should have been modified to bring it into agreement with the modified independent claims, Rule 5.1(a)(iii), PCT.

The system architecture provided by CopperComplete™ DSL uses a voice gateway 21 behind the ATM switch 22. The voice gateway 21 is an additional piece of equipment that converts the packetized voice traffic to voice signals acceptable to the PSTN (Public Switched Telephone Network) via a Class 5 switch 23. The voice gateway 21 converts the incoming
5 ATM Adaptation Layer 2 (AAL2) cells to time division multiplexed voice signals and sends it to the Class 5 switch 23 using multiple T1 trunks 24. This interface is, for example, GR-303 interface, the same as used by digital loop carriers (DLC), as described before in connection with Fig. 1.

It is believed the voice path used in the Coppercom architectures is a permanent virtual circuit
10 (PVC) that is configured during the provisioning of the CPE device, not in real time. This PVC carries all voice traffic as well as signaling traffic. The packet architecture used is ATM Adaptation Layer 2 (AAL2) for ATM encapsulation.

AAL2 has the ability to allow multiple connections multiplexed on one virtual circuit (VC). The multiplexing of multiple streams of data is done at the ATM Adaptation Layer. ATM
15 adaptation only takes place at the endpoints of an ATM network. Cells in an ATM network are routed or switched based upon their virtual path/virtual channel (VP/VC) identifier. In the case of a permanent virtual circuit (PVC), as in the case of the Coppercom architecture, the cells are switched to the same permanent destination previously established at the time of the CPE provisioning.

20 The Coppercom architecture does not use the ATM network to setup and teardown the voice connections, but instead uses the voice gateway. It is, therefore, not possible to take advantage of the ATM network for switching of individual voice calls. This is because, as explained previously, in the Coppercom architecture, multiple voice calls are multiplexed along with signaling data onto a single ATM virtual circuit. The contents of the ATM cell
25 stream are transparent to the ATM network. The ATM network only examines the header to ensure they are sent to the correct destination. The call assignment or switching in this architecture is independent of the ATM network. The call assignment cannot be determined until the signaling and voice data is de-multiplexed at the voice gateway.

Yaker, U.S. Pat. 5,848,142, discloses another telecommunication system. In Yaker, the
30 system is a PBX system capable of processing ISDN signaling over a digital subscriber loop.

RCA 90149

3/1

Yaker, however, is unrelated to switching environment of Asynchronous Transfer Mode call processing, as considered by the present invention.

SUMMARY OF INVENTION

Present inventors recognize that there are several drawbacks to prior DSL architectures. By using ATM AAL2 to carry voice, these architectures add significant cost and complexity to the end user equipment in terms of compression (when applicable), silence suppression, variable packet fill delay settings. In addition, there

28.
CLAIMS

- 5 1. A system for providing a messaging service comprising ATM virtual paths/virtual channels over a digital subscriber loop, the system further comprising:
- 10 a service control processor for monitoring and processing an incoming call via associated signaling from an ATM switch, the incoming call to be delivered over the digital subscriber loop to a receiving device capable of processing a first ATM virtual path/virtual channel corresponding to the incoming call;
- 15 a message processor capable of receiving a message via a second ATM virtual path/virtual channel; and
- 20 the service control processor determining whether the incoming call is answered by the receiving device and routing the incoming call to the message processor via the second ATM virtual path/virtual channel when the incoming call is not answered by the receiving device.
- 25 2. The system of claim 1, wherein the receiving device is a customer premises equipment.
- 30 3. The system of claim 1 wherein the message processor may be part of the service control processor.
- 35 4. The system of claim 1 wherein the determination of whether the incoming call is answered by the receiving device is by use of a timer.
- 40 5. The system of claim 4 wherein the value of the timer may be varied.
- 45 6. The system of claim 1 wherein the message comprises a voice mail message.
- 50 7. A method for providing a messaging service comprising ATM virtual paths/virtual channels over a digital subscriber loop, the method comprising:
- monitoring and processing an incoming call via associated signaling from an ATM switch, the incoming call to be delivered over the digital subscriber loop to a receiving device capable of processing a first ATM virtual path/virtual channel corresponding to the incoming call;
- determining whether the incoming call is answerable by the receiving device; and
- routing the incoming call to a message processor via a second ATM virtual path/virtual channel when the incoming call is not answerable by the receiving device based on the determining step.

.29.

8. The method of claim 7, wherein the receiving device is a customer premises equipment.

5

9. The method of claim 7 wherein the message processor is part of the service processor.

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10. The method of claim 7 wherein the determination of whether an incoming call is answerable by the receiving device is by determining whether the receiving device is off-hook.

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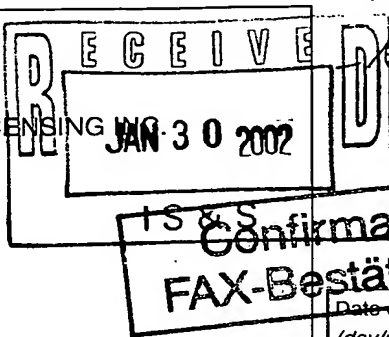
EXPRESS EV025962883US

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Fax nr: 609-734-7700

To:

TRIPOLI, J.
THOMSON MULTIMEDIA LICENSING INC.
P.O. Box 5312
2 Independence Way
Princeton, New Jersey 08540
ETATS-UNIS D'AMERIQUE



Diplom - PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year)

22.01.2002

Applicant's or agent's file reference
RCA90149

IMPORTANT NOTIFICATION

International application No.
PCT/US00/17475

International filing date (day/month/year)
26/06/2000

Priority date (day/month/year)
05/10/1999

Applicant
THOMSON LICENSING S.A

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

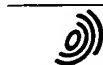
The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Event	Amend	Final Country Selection
Deadline	5 Feb 2002	to
Entered	DPF 2/1/02	David

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Barrio Baranano, A

Tel. +49 89 2399-8621



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 02/05/2001	Date of completion of this report 22.01.2002
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Hamer, J Telephone No. +49 89 2399 8827



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US00/17475

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Claims, No.:

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Drawings, sheets:

1/21-21/21	as originally filed
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- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

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- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-10
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

- 2. Citations and explanations**
see separate sheet

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V- Reasoned Statement

1. The following documents are cited:

D1: US-A-5 848 142 (YAKER RHODA) 8 December 1998 (1998-12-08)

D2: EP-A-0 928 123 (AT & T CORP) 7 July 1999 (1999-07-07)

D3: US-A-5 007 076 (BLAKLEY JAMES R) 9 April 1991 (1991-04-09)

2. Claim 1

The subject-matter of claim 1 of the present invention is concerned with a system for providing a messaging service over a digital subscriber loop using ATM virtual paths/virtual channels. In the claim, part of the ATM switch monitors a call which is to be delivered over the digital subscriber loop via an ATM virtual path/virtual channel to a receiving device which could, according to claim 2, be a customer premises equipment. If the receiving device does not answer the call, the call is routed to a message processor.

Many commercial private branch telephone exchange systems in use before the priority date of the present application have the features that incoming calls which are not answered by the receiving device (i.e. telephone) are routed to a central processor controlled answering machine or "voice mail" system which answers the call and processes a message.

An example of such a centralised message processing system is found in document D1. In this document, if a subscriber engaged in a call does not answer a further call, this further call is passed to a central message processor (see D1, col. 6, lines 13 to 17). The applicant has pointed out that claim 1 of the present application takes place in an ATM environment, whereas D1 is concerned with an ISDN system, and that thus D1 could not have anticipated problems and solutions of providing a messaging service in the ATM environment. The examiner does not agree with this point of view. Whilst the present claim 1 is now certainly novel over D1 due to taking place in an ATM environment, it merely involves the use of a known messaging feature in a known environment, i.e. ATM. The features of the claim merely deal with the problem of providing a messaging service in an ATM

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environment. The solution proposed by the claim is to provide this messaging service. The claim remains silent as to how this is done and as to whether any particular problems occur or how they are solved.

As a result of the above, all the features of claim 1, i.e. the ATM environment and messaging services, are well known from the prior art and claim 1 does not involve an inventive step. Thus claim 1 does not meet the requirements of Article 33(3) PCT.

3. The subject-matter of independent claim 7 is essentially the same as that of claim 1, but expressed in terms of method. Thus for the same reasons outlined above, claim 7 also does not meet the requirements of Article 33(3) PCT.
4. Dependent claims 2 to 6 and 8 to 10 are not appended to an independent claim which meets the requirements of Article 33(3) PCT. Furthermore, their subject-matter does not appear to contain anything of inventive significance which added to that of claim 1 would provide an inventive step. No features are disclosed which are not either already known from the prior art documents listed above or which are not obvious to a person skilled in the art of voice messaging.
5. The following deficiencies are found in the application:
 - a) The claims do not meet the requirements of Rule 6.2(b) PCT in that they do not contain reference signs.
 - b) The independent claims do not meet the requirements of Rule 6.3(b) PCT in that they are not divided into the two-part form.
 - c) The description should have been modified to bring it into agreement with the modified independent claims, Rule 5.1(a)(iii), PCT.

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Claims

1. System for providing a messaging service over a digital subscriber loop, comprising:

a service control processor for monitoring and processing an incoming call to be delivered over the digital subscriber loop to a receiving device;

a message processor for processing a message; and

the service control processor determining whether the incoming call is answered by the receiving device and routing the incoming call to the message processor when the incoming call is not answered by the receiving device.

2. The system of claim 1, wherein the receiving device is a telephone.

3. The system of claim 1 wherein the message processor may be part of the service control processor.

4. The system of claim 1 wherein the determination of whether an incoming call is answered by the receiving device is by use of a timer.

5. The system of claim 4 wherein the value of the timer may be varied.

6. The system of claim 1 wherein the message comprises a voice mail message.

7. Method for providing a messaging service over a digital subscriber loop, comprising the steps of:

routing an incoming call to a service processor;

processing the incoming call to be delivered over the digital subscriber loop to a receiving device;

determining whether or not the incoming call is answered by the receiving device; and

routing the incoming call to a message processor if the incoming call is not answered by the receiving device.

8. The method of claim 7, wherein the receiving device is a telephone.

9. The method of claim 7 wherein the message processor is part of the service processor.

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10. The method of claim 7 wherein the determination of whether an incoming call is answered by the receiving device is by use of a timer.

5 11. The method of claim 10 wherein the value of the timer may be varied.

12. The method of claim 7 wherein the message is a voice mail.

10 13. Apparatus for providing a voice messaging service over a digital subscriber loop, comprising:

voice message storage means for storing voice messages;

15 controller for determining whether a telephone call to a receiving device over the digital subscriber loop is answered; and

20 if the telephone call over the digital subscriber loop is not answered by the receiving device in a predetermined time, said controller routing the telephone call to the storage means for storing the telephone call.

14. The apparatus of claim 13, wherein the apparatus is part of a service control point.

25 15. The apparatus of claim 13 wherein the apparatus further comprising means of conveying to the receiving device that the telephone call has been stored.

30 16. The method of claim 7 further comprising the step of storing the incoming call.

17. The method of claim 16 further comprising the step of notifying the receiving device that an incoming call has been stored.

35 18. The method of claim 17 wherein the notifying step comprising ATM signaling.

3

The system architecture provided by CopperComplete™ DSL uses a voice gateway 21 behind the ATM switch 22. The voice gateway 21 is an additional piece of equipment that converts the packetized voice traffic to voice signals acceptable to the PSTN (Public Switched Telephone Network) via a Class 5 switch 23. The voice gateway 21 converts the incoming ATM Adaptation Layer 2 (AAL2) cells to time division multiplexed voice signals and sends it to the Class 5 switch 23 using multiple T1 trunks 24. This interface is, for example, GR-303 interface, the same as used by digital loop carriers (DLC), as described before in connection with Fig. 1.

It is believed the voice path used in the Coppercom architectures is a permanent virtual circuit (PVC) that is configured during the provisioning of the CPE device, not in real time. This PVC carries all voice traffic as well as signaling traffic. The packet architecture used is ATM Adaptation Layer 2 (AAL2) for ATM encapsulation.

AAL2 has the ability to allow multiple connections multiplexed on one virtual circuit (VC). The multiplexing of multiple streams of data is done at the ATM Adaptation Layer. ATM adaptation only takes place at the endpoints of an ATM network. Cells in an ATM network are routed or switched based upon their virtual path/virtual channel (VP/VC) identifier. In the case of a permanent virtual circuit (PVC), as in the case of the Coppercom architecture, the cells are switched to the same permanent destination previously established at the time of the CPE provisioning.

The Coppercom architecture does not use the ATM network to setup and teardown the voice connections, but instead uses the voice gateway. It is, therefore, not possible to take advantage of the ATM network for switching of individual voice calls. This is because, as explained previously, in the Coppercom architecture, multiple voice calls are multiplexed along with signaling data onto a single ATM virtual circuit. The contents of the ATM cell stream are transparent to the ATM network. The ATM network only examines the header to ensure they are sent to the correct destination. The call assignment or switching in this architecture is independent of the ATM network. The call assignment cannot be determined until the signaling and voice data is de-multiplexed at the voice gateway.

SUMMARY OF INVENTION

Present inventors recognize that there are several drawbacks to prior DSL architectures. By using ATM AAL2 to carry voice, these architectures add significant cost and complexity to the end user equipment in terms of compression (when applicable), silence suppression, variable packet fill delay settings. In addition, there